COBALT (ATOMIC ABSORPTION, DIRECT ASPIRATION)

1.0 SCOPE AND APPLICATION

1.1 See Section 1.0 of Method 7000.

2.0 SUMMARY OF METHOD

2.1 See Section 2.0 of Method 7000.

3.0 INTERFERENCES

3.1 See Section 3.0 of Method 7000 if interferences are suspected.

3.2 Excesses of other transition metals may slightly depress the response of cobalt. Matrix matching or the method of standard additions is recommended.

4.0 APPARATUS AND MATERIALS

4.1 For basic apparatus, see Section 4.0 of Method 7000.

4.2 Instrument parameters (general):

4.2.1 **Cobalt hollow cathode lamp.**
4.2.2 **Wavelength:** 240.7 nm.
4.2.3 **Fuel:** Acetylene.
4.2.4 **Oxidant:** Air.
4.2.5 **Type of flame:** Oxidizing (fuel lean).
4.2.6 **Background correction:** Required.

5.0 REAGENTS

5.1 See Section 5.0 of Method 7000.

5.2 Preparation of standards:

5.2.1 **Stock solution:** Dissolve 1.000 g of cobalt metal (analytical reagent grade) in 20 mL of 1:1 HNO_3 and dilute to 1 liter with Type II water. Chloride or nitrate salts of cobalt (II) may be used. Although numerous hydrated forms exist, they are not recommended unless the exact composition of the compound is known. Alternatively, procure a certified standard from a supplier and verify by comparison with a second standard.

5.2.2 Prepare dilutions of the stock solution to be used as calibration standards at the time of analysis. The calibration standards should be prepared using the same type of acid and at the same concentration as will result in the sample to be analyzed after processing.

6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

6.1 See Chapter Three, Section 3.1.3, Sample Handling and Preservation.

7.0 PROCEDURE

7.1 Sample preparation: The procedures for preparation of the sample are given in Chapter Three, Section 3.2.

7.2 See Method 7000, Paragraph 7.2, Direct Aspiration.

8.0 QUALITY CONTROL

8.1 See Section 8.0 of Method 7000.

9.0 METHOD PERFORMANCE

9.1 The performance characteristics for an aqueous sample free of interferences are:

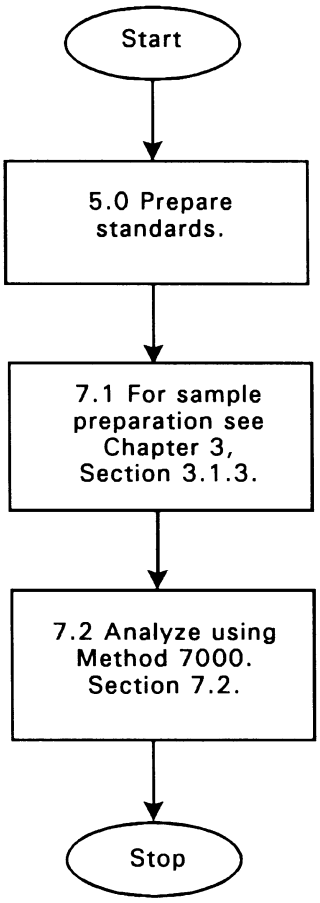
Optimum concentration range: 0.5-5 mg/L with a wavelength of 240.7 nm.
Sensitivity: 0.2 mg/L.
Detection limit: 0.05 mg/L.

9.2 In a single laboratory, analysis of a mixed industrial-domestic waste effluent, digested with Method 3010, at concentrations of 0.2, 1, and 5 mg/L gave standard deviations of ±0.013, ±0.01, and ±0.05, respectively. Recoveries at these levels were 98% and 97%, respectively.

9.3 For concentrations of cobalt below 0.1 mg/L, the furnace procedure (Method 7201) is recommended.

10.0 REFERENCES

1. Methods for Chemical Analysis of Water and Wastes, EPA-600/4-82-055, December 1982, Method 219.1.


Start
5.0 Prepare standards.
7.1 For sample preparation see Chapter 3, Section 3.1.3.
7.2 Analyze using Method 7000. Section 7.2.
Stop